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(54) Title: **METHOD AND SYSTEM FOR PREDICTING PROCESS PERFORMANCE USING MATERIAL PROCESSING TOOL AND SENSOR DATA**

(57) Abstract: A material processing system including a process tool and a process performance prediction system. The performance prediction system includes sensors coupled to the tool to measure tool data and a controller coupled to the sensors to receive tool data, where the controller is configured to predict the process performance for the tool using the tool data. A method for detecting a fault in a material processing system using a process performance prediction model is also provided. The method includes preparing the tool, initiating a process in the tool, and recording tool data to form a tool data matrix. The method also includes performing a matrix multiplication of the tool data matrix and a correlation matrix to form predicted process performance data, where the correlation matrix includes the performance prediction model, comparing the predicted data with target data, and determining a fault condition of the processing system from the comparing step.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/16245

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : H05H 1/00
US CL : 156/345.24

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 156/345.24,345.25,345.26,345.27

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EAST image and word search

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,642,296 A (SAXENA) 24 June 1997, column 3, line 3 through column 10, line 67.	1-36
A	US 6,183,594 B1 (NAZZAL) 06 February 2001, column 3, line 59 through column 4, line 64.	1-36
A	US 5,971,591 A (VONA et al) 26 October 1999, column 5, line 55 through column 8, line 20.	1-36

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See patent family annex.

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